Medical Officers of Schools Association.

FOOTBALL IMPETIGO

An Enquiry into a Contagious Affection of the Skin occurring amongst Football Players.

A PAPER READ BEFORE THE ASSOCIATION

On 10*th December*, 1895.

BY

H. G. ARMSTRONG, M.R.C.S.

MEDICAL OFFICER, WELLINGTON COLLEGE.

Published by order of the Association.

H. Aldersmith,
Charles Shelly, } *Hon. Secs.*

January, 1896.

London:
J. & A. CHURCHILL, 11, NEW BURLINGTON STREET.
1896.

FOOTBALL IMPETIGO.

In December of last year, I brought under the notice of the Association the prevalence of a peculiar skin eruption amongst football players, which, I understood, had been observed also in other schools besides that with which I am connected. I suggested that it was a subject into which we might with profit inquire. To this the Council of the Association agreed, and I was directed by them to issue a circular to members, with a view to ascertain the extent of the prevalence of the disorder; also to make inquiry into its ætiology and treatment, both prophylactic and curative, and to prepare a report for the Association. For this purpose a sum of money was granted from the funds.

The circular met with a gratifying response, information being received from thirty-seven schools. From this it appeared that at those schools where the Association game is played, with two exceptions, the disease is unknown, and that of the fourteen schools at which the game is played under Rugby Union rules, it is unknown at four, while at the other ten it is of frequent occurrence. In these ten were included all the larger schools at which the Rugby game is played. From the four exempts I got no information which adequately accounted for their exemption, though I made special inquiry in each case.

In dealing with these reports, I do not propose to refer to them individually, which would probably be unnecessary and undesirable, but in recording my thanks to the members, I must refer specially to Dr. Horace Savory, of Haileybury, who not only sent me a most valuable report on his experience, but furnished me with an excellent photograph of a typical case, an enlargement from which is here reproduced.

Name.—I propose to call it "Football Impetigo." It is, I believe, a true impetigo, and in giving the prefix "Football," I do so in the same way as we name diseases specially prevalent amongst certain trades and occupations, such as "bakers' eczema," "miners' phthisis," or "chimney sweeps' cancer." It is known to the Wellington boys as "scrum-pox," which is, I think, an excellent synonym. At other schools it is variously called, "mud fever," "jersey itch," "college leprosy." All these names are undesirable, as they involve a theory which is incorrect.

Description.—After a short period of itching, a slight erythematous spot appears on the skin, on which a vesicle, varying in size from a split pea to a small horse-bean, quickly forms. The vesicle at first contains clear straw-coloured fluid, which becomes opaque as it reaches maturity. It then bursts and dries with a brown crust, generally flat, but more rarely with the heaped up crusts of ordinary impetigo. The disease spreads by the occurrence of fresh crops of vesicles, the result of "auto-infection." In some cases a vesicular or pustular margin, surrounded by a red areola, forms round the scab. As the vesicle extends, the scab sometimes falls off, leaving a comparatively healthy, smooth surface in the centre. This variety, which is similar to the Impetigo Bullosa of Crocker, is well illustrated in the photograph. The vesicles have no special distribution. Their most common site is on the face over the malar bones, and over the lower jaw, but I have frequently seen them on and behind the ears, and by secondary infection on the fingers. In some instances it attacks the scalp, but considering the number of cases, these are comparatively few. The lymphatic glands are always affected, sometimes by simple enlargement; in others there is a tendency to suppurative dermatitis, and there is often a tendency to the formation of furuncles, which lasts for some time after the disappearance of the original disease.

Bacteriology.—Material was taken from six cases, with which cultivations were made and were forwarded to the Clinical Research Association for investigation. This was

undertaken by Dr. James Galloway, who has forwarded me a full report, which appears as an appendix, and the following abstract. I may add that a similar investigation was made on behalf of Dr. Savory, of Haileybury, by Mr. Kenneth Lawson, with a somewhat similar result.

Abstract of Dr. Galloway's Report.

In December of 1894 I undertook on behalf of the Clinical Research Association an investigation, from the bacteriological standpoint, of material forwarded to me by Mr. H. G. Armstrong, of Wellington College, from an outbreak of severe pustular dermatitis affecting boys under his charge. The boys suffering from the disease appear to be those who play Rugby football, and the members of the school fifteen appear to have been most severely affected. From information provided, this disease is not uncommon in schools where Rugby football is played, and passes under the names of "football impetigo," "scrum-pox," &c.

The investigations were conducted on the discharges, scabs, and on inoculations directly made on culture media from the vesicles occurring on the patients affected. The inoculations thus obtained were examined, and cultures were also made from the discharges, and from the scabs.

The series of investigations were carried on with material obtained from six patients. In all these cases there were obtained the staphylococcus pyogenes aureus, or albus, or both. Besides these two organisms, the presence of the staphylococcus citreus was probable.

Judging from the results obtained from cultures kept under observation for some time, both aureus and albus might be obtained from any one case, although one or other was usually predominant in each culture; staphylococcus aureus seems to be the predominant organism, and, in the majority of instances, if the culture is not pure, it seems to outstrip and overgrow albus.

No other organisms than those mentioned were observed in the cultures.

FOOTBALL IMPETIGO

(*From a Photograph*),

SHEWING STAGES OF PAPULE, VESICLE, PUSTULE, AND SCAB.

There seems to be little doubt, therefore, that the pustular dermatitis from which the boys suffered was really of the nature of an "impetigo," that is, of a pyodermia produced by the inoculation of the organisms already mentioned.

One point of interest is deserving of mention, *viz.*, the disease under consideration seems to be much more virulent than ordinary impetigo. In many cases it causes scars of considerable size, and produces acute adenitis of severe degree.

From the cultural characteristics, however, no information can be obtained bearing on the fact. The cultures produced growth exactly similar to those obtained from impetigo as seen in young children.

(Signed) JAMES GALLOWAY.

Etiology.—From the above it is evident that the virulent organism of the disease is one of the staphylococci, and it may be inferred that in most instances it is conveyed from person to person by direct and violent contact. That another source of infection exists, namely, in the jerseys, is also certain. Both at Haileybury and at Wellington cases appeared in the spring term of this year, when, owing to the prolonged frost no football could be played. These could be traced to the putting on of jerseys which had remained unwashed from the previous term. The case represented in the photograph was one of these. In connection with this, it is interesting to observe that Dr. Seitz, of Munich, has reported the discovery of the staphylococcus pyogenes albus in woollen clothes nineteen days after they had been worn. Our cases more than corroborate this, as a period of at least five weeks must have elapsed between the occasions of wearing the jerseys. Other articles of clothing or toilet, such as caps, towels, or shaving brushes may similarly be the vehicles of contagion. The attendant on the patient may also be inoculated, as happened to the matron of our sanatorium, who had a large vesicle on her hand from attending to a boy whose scalp was affected.

The soil of the football field has, by some, been held to be the *fons et origo mali.* This, however, the returns show to be untenable, as the schools where it has been prevalent are situated on every variety of soil. At Haileybury, at one time, it was supposed that "a muddy, smelling field" was the cause; but, although the field was abandoned, the complaint reappeared in successive years.

The dye of the jerseys also has been alleged as a source. The fact that the epidemics occur generally towards the end of the term, when the jerseys are old, and not at the beginning, when they are new, is against this theory. Through the kindness of Mr. Hollins, of Mansfield, who had football-playing sons at both Haileybury and Wellington, a complete investigation of the manufacture of the jerseys and the dye has been made, and the latter after chemical examination has been declared "non-poisonous."

An insufficiency of vegetable diet has also been suggested as having a causal relation; but, though this may be possible, I consider it to be doubtful. At most schools there is now, I think, a good deal of attention to this in the ordinary food, and the boys supplement this very largely by the purchase of oranges and other fruits.

Distribution.—The returns show that schools both in Scotland and England, from Edinburgh to Devonshire, are attacked. (We have no members in Ireland, and consequently no returns.) As I have already said, it is, with slight exceptions, only found amongst those who play the Rugby game, and of these, almost entirely amongst the forwards. The players outside the "scrum" are mostly exempt, though I have occasionally seen half-backs and three-quarters affected. The "big side" players are much more affected than the smaller boys, probably because they play a harder game, with a tighter scrum, and put their heads down more. Though the older boys are the principal victims, it is found that it occurs very little, or not at all, at the universities or the military colleges. Age seems to some extent to have a protecting influence. As an illustration of this, in the report from Cheltenham, Mr. Arthur Cardew reports that

though it is extremely prevalent at the college, it is unknown at the Normal Training College, where the age of the students varies from nineteen to thirty years, and where the same game is played.

It appears epidemically, in some years being entirely absent, in others very virulent. The worst epidemic that I have seen occurred in the autumn term last year, and this was, I believe, the experience elsewhere.

Treatment.—The measures to be adopted for prophylaxis will be easily understood from the foregoing remarks. No boy who has any appearance of the disorder should be allowed to play till he is completely cured. More attention should be paid to having the jerseys cleaned, and on the appearance of the complaint, the jerseys should be disinfected in an efficient apparatus, preferably a steam disinfector. It is not only the jersey of the affected boy that requires attention, but those of all the players.

Boys should be instructed as to the extreme contagiousness of the malady, and warned against any common use of articles of clothing or toilet. Although I believe a clean jersey may be exonerated from causing the disease, yet the coarse woollen garment used at most schools causes, by its roughness, the abrasions on the soft parts, through which the virus finds admission, and I should recommend that one of a softer material, such as merino, be adopted for, at all events, big side games. The addition of a linen collar would be advantageous. I think it desirable that *all* the forwards should wear caps with ear-pieces, fastening under the chin. These should be made of some soft washing material. They protect the ears and surrounding parts to a great extent, and would limit the liability of the players both to the disease in question, and also to other injuries, such as hæmatoma auris. No buckles should be permitted at the back of the trousers, or of the garments that do duty for trousers at the Rugby game, nor should straps or gymnasium belts be worn.

The *curative* treatment is generally simple. Almost any germicide ointment, *if the crusts are removed* and the

ointment properly applied to the underlying sore, will effect a cure. I have generally depended on sulphur ointment or on a mixture of boro-glyceride and sulphur. Other applications that are recommended are white precipitate ointment, icthyol, crysophanic acid, a mixture of zinc, lead and citrine ointments, and boracic acid, iodoform, or carbolic acid ointments, and the like. If the disease is seen in the vesicular stage it may be aborted by rupturing the vesicles and constantly applying a saturated solution of boracic acid. Though most cases get well easily under the above treatment, in some boys, especially those of a sebaceous type, it is most obstinate and gives rise to sequelæ. These are mostly furuncles, prolonged adenitis with occasional suppuration, and a general folliculitis. These must be treated on general principles; in the worst cases a liberal diet, including wine, is indicated. As to internal treatment, the balance of evidence is against it, but I have certainly thought that some good came from the administration of arsenic, along with local treatment. I have generally given it in the form of Fowler's solution combined with iodide of potassium, and sarsaparilla, or as a pill in combination with iron.

Remarks.—It is peculiar that football as a factor in producing impetiginous eruptions has not engaged the attention of dermatologists more. The only reference that I have found is in Dr. Jamieson's book on Skin Diseases, where it is dealt with very shortly.

The exact pathology of impetigo has been much advanced during recent years, and, indeed, has been almost entirely revolutionised by the study of bacteriology. The present position is summarised by Dr. Colcott Fox in the *Medical Annual* for 1893. Bockhardt, in 1887, showed that there was a pustular eruption caused by the staphylococcus aureus and albus, and distinguished from eczema and other pustular diseases by a series of specific symptoms. Wickham finds by bacteriological researches that staphylococci aureus and albus are present in all secretions of impetigo and pustules from the very beginning. Inoculation

of either can reproduce impetigo. They are identical with those met with in other suppurations. To the same category of disease, therefore, belong impetigo, ecthyma, folliculitis, furuncles, and to this group the term staphylococcia purulenta cutanea is given. Dr. Walter Smith, of Dublin, in "Recent Advances in the Ætiology of Diseases of the Skin," *Dublin Journal of Medical Science*, January 1, 1892, points out that it is a distinct advance to know that impetigo, boils and carbuncles are invariably produced under the influence of micro-organisms. The clinical differences in these affections can be explained as follows:— "Pus probably varies in virulence according to its origin, and pathogenic micro-organisms certainly vary in virulence according to the external condition in which they find themselves. In a word, the character of the mischief done, *i.e.*, the type of the disease, depends not alone upon its direct cause, but also largely upon the mode of entrance and the seat of development of the organisms (Bockhardt: Carré)." Microphytes enter the skin generally through a breach of surface, but they can penetrate into the lymph channels of the skin through the intact epidermis (Carré). "If the micrococci invade only the epidermis we have a superficial pustule, *i.e.*, (*a*) impetigo; if the intruders find their way deeper down the gland ducts and hair follicles we have a more violent inflammation with or without necrosis, *i.e.*, (*b*) a boil, phlegmon, or suppurative folliculitis, and a congeries of furuncular points; (*c*) a carbuncle." This pathology receives clinical support from the variety of the disease we have been considering, as it is by no means uncommon to find in the same case the superficial eruption associated with boils, phlegmon and folliculitis.

"Infection from within outwards occurs in only a small minority of cases, and may account for some cases of abscesses, boils, and other forms of local inflammation following in the wake of continued fevers and the like." The long continuance of the boils after the cure of the original disease may be evidence of this.

APPENDIX.

REPORT ON CULTURES AND OTHER SPECIMENS FROM CASES OF SKIN DISEASE UNDER THE CARE OF

H. G. ARMSTRONG, Esq.,
WELLINGTON COLLEGE.

The order adopted in this report is first to describe in detail the results of the examination of the specimens from the individual cases, and subsequently to formulate the conclusions which appear to result from these examinations.

In all, six cases were examined, though from some of these many specimens were obtained.

Case I. (M—e).—From this patient a culture was made directly from the scab on glycerine-agar. The tube was incubated at a temperature of 25° C. In two days a small, somewhat indefinite growth was observed, which proved, on microscopic examination, to consist of small cocci in groups. A sub-culture was made from this on glycerine-agar, and in a few days a considerable number of colonies appeared, which assumed a yellow pigmentation. This organism on subsequent cultivation was found to liquefy gelatine, and proved to be the staphylococcus pyogenes aureus.

Case II. (R—y).—From this case the cultivation was made from a vesicle on glycerine-agar, and treated in the same way as Case I. Colonies resulted from this culture, which remained white on subsequent cultivation and in the original cultures; these also liquefied gelatine, and on microscopic examination proved to consist of cocci arranged in groups, thus showing the peculiarities of the staphylococcus pyogenes albus.

Case III. (H—e). — The culture from this case was brought to the laboratory having been made on blood serum. An impure growth resulted, and from this sub-cultures

were made on glycerine-agar. In these cultures colonies of both species of pus-forming cocci above-mentioned were identified.

Case IV. (M—y).—From this case several cover-glass preparations of the contents of vesicles were examined. There were found to be contained in the fluid large numbers of epithelial cells in various stages of degeneration, leucocytes of various kinds, many of them multi-nuclear as well as the large mono-nucleated variety. In addition, large numbers of micro-organisms were present; the majority of these were micrococci, some being arranged in the form of diplococci. Cultures made on glycerine-agar and on other media from the pustules existing in this case yielded both staphylococcus pyogenes aureus and albus on farther cultivation and separation of the colonies.

Case V. (W—n).—In the case of this patient also cover-glass preparations, as well as cultures, were made from pustules. The contents of the pustules were found to be similar in all respects to those observed in the previous case. Leucocytes, both mono- and multi-nuclear, and in various stages of degeneration, were present, as well as many epithelial cells. The bacteria were similar to those already mentioned in Case IV. It is noteworthy that certain diplococci were seen in the cover-glass preparations which did not appear to be obtained in the cultures. The cultures made in this case yielded both forms of pus-forming cocci already mentioned, but the staphylococcus pyogenes aureus was greatly in excess of the white species.

Case VI.—At a somewhat later date than in the cases already mentioned, material, consisting of cultures, and also crusts from which cultures were made, were examined from a patient similarly affected to those already mentioned. From these preparations both the staphylococcus pyogenes aureus et albus were isolated. The results agreed substantially with what had been already obtained.

It will be observed, therefore, that the results of the above series of observations are fairly uniform. The organisms found in largest numbers were the two pus-

forming species — staphylococcus pyogenes aureus and staphylococcus pyogenes albus. It will be noted that at first it appeared that these did not exist in each case, but a prolonged observation of the cultures seems to show that both species were always present, though in any individual lesion one or other is in predominance and is presumably the chief cause of the suppuration in that lesion. In addition, it is probable that the staphylococcus pyogenes citreus was also present in many of the cases.

The results agree in the main with those obtained by other observers when examining the lesions of Impetigo contagiosa and other pus-forming diseases of the skin (*vide* Radcliffe-Crocker, "Diseases of the Skin," p. 155, 2nd edit.; *Brit. Journ. of Derm.*, p. 39, 1895; ref. to Leloir "On the Pyodermias," *Journ. des Malad. Cutan.*, vol. v., 1893; in *Brit. Journ. of Derm.*, vol. vii., No. 1, p. 31, 1895). This result was perhaps to be expected, but it serves to emphasise a point apt to be overlooked, viz., that a lesion characterised by the production of a vesicle or bulla is capable of being produced by the inoculation of pus-forming staphylococci. It will be noted also that in more than one of the cover-glass preparations from the contents of the vesicles and pustules examined, a micro-organism having the aspect of a diplococcus was observed. This bacterium was, however, not very definite in its characters, and certainly had not the characteristics described by Dr. W. Bulloch, obtained from Mr. Pernet's case of acute fatal pemphigus (*Brit. Journ. of Derm.*, p. 159 and 160, 1895). Indeed the diplococcus in the cases described in this report may only have been examples of staphylococci cohering in pairs.

There can remain little doubt, therefore, that the cases under observation were examples of acute infective dermatitis due to the inoculation of pus-forming bacteria, the chief of those concerned being the staphylococcus pyogenes aureus and the staphylococcus pyogenes albus.

J. G.